Smart Cities: Enhancing a Smart Framework for Energy Infrastructure

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Abstract

Smart cities are known to modernize urban concepts by implementing technology that uses big data to improve quality of life, transportation, livability, governmental operations, as well as to increase sustainability in infrastructure. The international scientific community's rising concern for environmental issues has created a need for eco-friendly cities. This need attracts the interest of many different economic sectors, including although not limited to government, corporations, researchers and engineers. This project investigates the integration of smart city infrastructure within the University of Bridgeport to further evaluate its effects on sustainability.

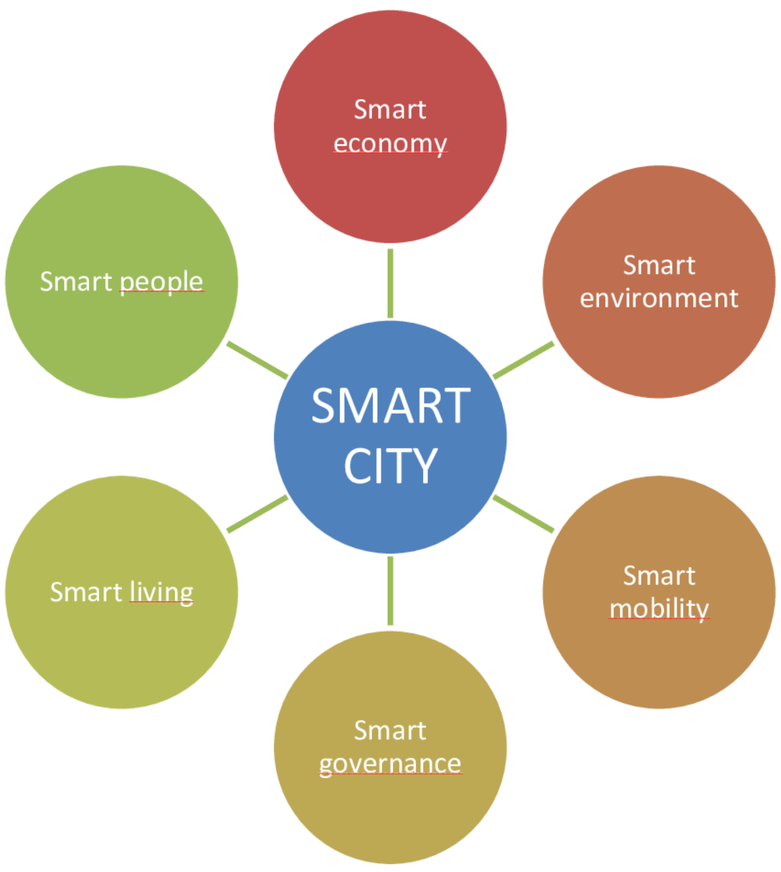


Figure 1: Smart City Sectors [3]

Smart Energy

Smart metering is essential for the development of smart energy infrastructure. Smart meters are intelligent devices that optimize your energy usage by monitoring and recording usage data. The grid has an enormous potential for smart energy devices, and is an essential step in the creation of a smart city. The technology allows for optimization of energy usage by providing real time data and enabling managers to develop a holistic projection and planning their future energy generation and usage. Reliable integration of distributed energy sources is essential in smart cities. Energy storage systems are also an important addition to this system, by providing peak shaving and time of use cost management.

Smart Infrastructure

The University of Bridgeport is located in Bridgeport, Connecticut. Connecticut is a state that is in need of updating infrastructure. Roads and buildings within the university have been upgraded, however improvements are always necessary. These improvements can help implement the changes for this community to become a smart. Technological advancements are needed for student satisfaction to make the University of Bridgeport a more eco-friendly campus. Implementing smart trash cans or recycling can be seen as an improvement.

Smart Building

Smart buildings focus on green energy. The University of Bridgeport can optimize the use of wireless connections to have building management systems throughout the city utilizing the IoT (Internet of Things). Buildings should be able to shut down during nighttime hours, and hours of non-use. Lighting controls and setbacks should be used to help monitor heating levels within buildings.

Smart building energy management systems (SBEMS) technology allows for control and automation of several building functions, as lighting, HVAC (heating, ventilation, and air conditioning), security system, fire alarm and most importantly, energy management. The advantages of SBEMS go far beyond managing building operation, allowing energy managers to benchmark and forecast energy usage. The environmental benefit of such implementation are grand and facilitate a holistic integration of sustainability with near immediate financial benefits.

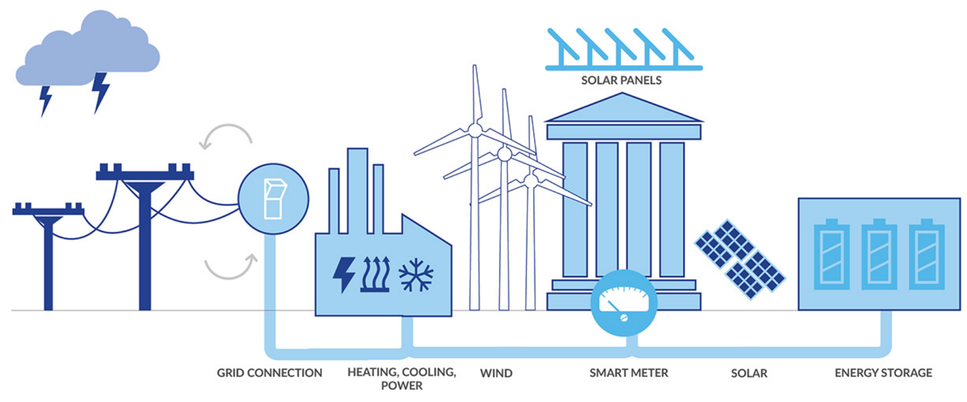
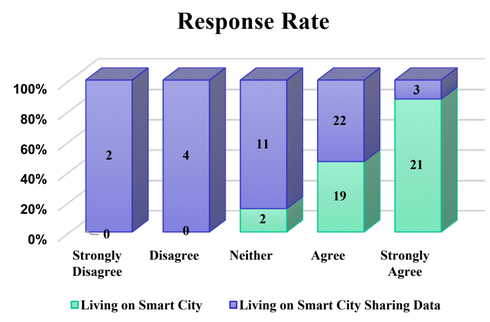


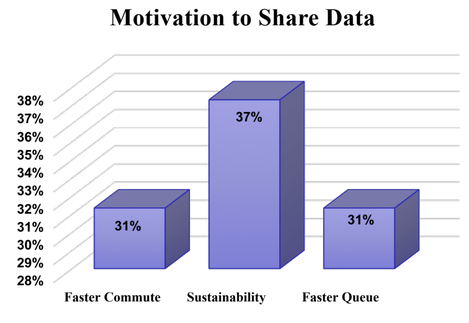
Figure 2: Smart Energy Infrastructure [ANBARIC]

Big Data and Privacy

The University of Bridgeport is located in Bridgeport, Connecticut. Roads and buildings within the university have been upgraded, however technological improvements are always necessary. These improvements can help implement the changes for this community to become a smart city. Technological advancements are needed for student satisfaction to make the University of Bridgeport a more eco-friendly campus. Implementing smart trash cans or recycling can be seen as an improvement.

Of a random sample of 50 participants within the city, 95% of applicants surveyed would like to live in a smart city and contribute to a smart city's culture. The initial reaction between these responses was very positive. The structure of the questions led us to believe that most respondents liked the idea of a smart city, but did not respond well to their data being shared. Our conditions changed from the first to the second question with respect to data being shared.





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